

# PATENT COOPERATION TREATY

# PCT

## INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

|   |  |   |
|---|--|---|
| Applicant's or agent's file reference<br><br>63558D   | <b>FOR FURTHER ACTION</b><br><br>see Form PCT/ISA/220<br>as well as, where applicable, item 5 below. |   |
| International application No<br><br>PCT/US2005/008917 | International filing date (day/month/year)<br><br>17/03/2005   | (Earliest) Priority Date (day/month/year)<br><br>17/03/2004 |
| Applicant<br><br>DOW GLOBAL TECHNOLOGIES INC.         |  |   |

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 10 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

**1. Basis of the report**

- a. With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ The international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

- b. ☐ With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, see Box No. I.

**2. ☐ Certain claims were found unsearchable (See Box II).**

**3. ☒ Unity of invention is lacking (see Box III).**

**4. With regard to the **title**,**

☒ the text is approved as submitted by the applicant.

☐ the text has been established by this Authority to read as follows:

**5. With regard to the **abstract**,**

☒ the text is approved as submitted by the applicant.

☐ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box No. IV. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

**6. With regard to the **drawings**,**

- a. the figure of the **drawings** to be published with the abstract is Figure No. 1

☒ as suggested by the applicant.

☐ as selected by this Authority, because the applicant failed to suggest a figure.

☐ as selected by this Authority, because this figure better characterizes the invention.

- b. ☐ none of the figures is to be published with the abstract.

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## Box II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:  
because they relate to subject matter not required to be searched by this Authority, namely:
  
2. ☐ Claims Nos.:  
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
  
3. ☐ Claims Nos.:  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

## Box III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☒ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

### Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☒ No protest accompanied the payment of additional search fees.

**FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210**

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-9

The subject matter of claims 1-9 relates to a composition comprising two different polymerization catalysts and a chain transfer agent for polymerizing one or more monomers.  
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2. claims: 10 part 17-27

olefin interpolymers characterized by parameters  
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3. claims: 11, part 17-27

olefin interpolymers characterized by parameters  
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4. claims: 12, part 17-27

olefin interpolymers characterized by parameters  
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5. claims: 13, part 17-27

olefin interpolymers characterized by parameters  
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6. claims: 14, part 17-27

olefin interpolymers characterized by parameters  
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7. claims: 15, part 17-27

olefin interpolymers characterized by parameters  
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8. claims: 16, part 17-27

olefin interpolymers characterized by parameters  
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|--|---|--|
| <b>A. CLASSIFICATION OF SUBJECT MATTER</b><br>C08F297/08 C08F4/646 C08F2/38  |   |  |
| According to International Patent Classification (IPC) or to both national classification and IPC  |   |  |
| <b>B. FIELDS SEARCHED</b><br>Minimum documentation searched (classification system followed by classification symbols)<br>C08F   |   |  |
| Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched  |   |  |
| Electronic data base consulted during the international search (name of data base and, where practical, search terms used)<br>EPO-Internal, COMPENDEX, WPI Data  |   |  |
| <b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b>  |   |  |
| Category   | Citation of document, with indication, where appropriate, of the relevant passages  | Relevant to claim No.  |
| X  | WO 03/022890 A (EXXONMOBIL CHEMICAL PATENTS INC; MINK, ROBERT, I; NOWLIN, THOMAS, E; S) 20 March 2003 (2003-03-20)<br>paragraph '0014!<br>paragraph '0021!<br>claims<br>-----<br>-/-- | 1-5,8  |
| <input checked="" type="checkbox"/> Further documents are listed in the continuation of box C  |   |  |
| <input checked="" type="checkbox"/> Patent family members are listed in annex  |   |  |
| Special categories of cited documents  |   |  |
| *A* document defining the general state of the art which is not considered to be of particular relevance<br>*E* earlier document but published on or after the international filing date<br>*L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)<br>*O* document relating to an oral disclosure, use, exhibition or other means<br>*P* document published prior to the international filing date but later than the priority date claimed<br>*T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention<br>*X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone<br>*Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art<br>*Z* document member of the same patent family |   |  |
| Date of the actual completion of the international search<br>22 November 2005  |   | Date of mailing of the international search report<br>20.12.2005 |
| Name and mailing address of the ISA<br>European Patent Office, P.B. 5818 Patentlaan 2<br>NL - 2280 HV Rijswijk<br>Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,<br>Fax. (+31-70) 340-3016   |   | Authorized officer<br>Thomas, D                                  |

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| C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT |   |                      |
|--|---|----------------------|
| Category   | Citation of document, with indication, where appropriate, of the relevant passages  | Relevant to claim No |
| X  | <p>LIEBER SUSANNA ET AL: "Propene polymerization with catalyst mixtures containing different ansa-zirconocenes: chain transfer to alkylaluminum cocatalysts and formation of stereoblock polymers"</p> <p>MACROMOLECULES; MACROMOLECULES DEC 2000 ACS, WASHINGTON, DC, USA, vol. 33, no. 25, December 2000 (2000-12), pages 9192-9199, XP002332920</p> <p>cited in the application</p> <p>the whole document</p>              | 1-3,8                |
| X  | <p>PRZYBYLA, FINK: "Two different on the same silica supported metallocene catalysts, activated by various trialkylaluminums"</p> <p>ACTA POLYMERICA, vol. 50, 21 April 1999 (1999-04-21), pages 77-83, XP002332921</p> <p>WEINHEIM</p> <p>cited in the application</p> <p>the whole document</p>   | 1-5,8                |
| X  | <p>CHIEN JAMES C W ET AL: "Homogeneous binary zirconocenium catalysts for propylene polymerization. II. Mixtures of isospecific and syndiospecific zirconocene systems"</p> <p>J POLYM SCI PART A; JOURNAL OF POLYMER SCIENCE, PART A: POLYMER CHEMISTRY 1999 JOHN WILEY &amp; SONS INC, NEW YORK, NY, USA, vol. 37, no. 14, 1999, pages 2439-2445, XP002332922</p> <p>cited in the application</p> <p>the whole document</p> | 1-3                  |
| A  | <p>✓ EP 1 197 500 A (MITSUI CHEMICALS, INC)</p> <p>17 April 2002 (2002-04-17)</p> <p>paragraph '0044!</p> <p>paragraph '0273!</p> <p>examples 40-62</p> <p>claims 17-44</p>   | 1-7                  |
| X  | <p>✓ US 2002/107341 A1 (MURRAY REX E ET AL)</p> <p>8 August 2002 (2002-08-08)</p> <p>claim 12</p>   | 1-3                  |
| X  | <p>✓ US 2002/161141 A1 (MAWSON SIMON ET AL)</p> <p>31 October 2002 (2002-10-31)</p> <p>figure 3</p>   | 1-3,5-7              |
| X  | <p>✓ US 2004/044154 A1 (KUO CHI-I ET AL)</p> <p>4 March 2004 (2004-03-04)</p> <p>examples</p>   | 1-3                  |

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| C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT |  |                      |
|--|--|----------------------|
| Category   | Citation of document with indication, where appropriate, of the relevant passages  | Relevant to claim No |
| X  | <p>✓ US 2003/153689 A1 (MEHTA ASPY KEKI ET AL)<br/>14 August 2003 (2003-08-14)<br/>paragraphs '0164! - '0166!<br/>-----</p>  | 1-4                  |
| X  | <p>TANEM B S ET AL: "Blends of single-site linear and branched polyethylene. I. Thermal characterisation"<br/>POLYMER, ELSEVIER SCIENCE PUBLISHERS B.V, GB,<br/>vol. 42, no. 12, June 2001 (2001-06),<br/>pages 5389-5399, XP004231005<br/>ISSN: 0032-3861<br/>Table 1 : LLDPE(1)<br/>-----</p>  | 10                   |
| X  | <p>STARCK P ET AL: "Thermal properties of ethylene/long chain alpha-olefin copolymers produced by metallocenes"<br/>January 2002 (2002-01), EUROPEAN POLYMER JOURNAL, PERGAMON PRESS, LONDON, GB,<br/>PAGE(S) 97-107 , XP004308064<br/>ISSN: 0014-3057<br/>table 1<br/>OCT1: polymers with comonomers:<br/>tetradecene, octadecene<br/>-----</p> | 10,17                |
| X  | <p>YOON J-S ET AL: "Thermal and mechanical properties of ethylene/alpha-olefin copolymers produced over (2-MeInd)2ZrCl2/MAO system"<br/>June 2000 (2000-06), POLYMER, ELSEVIER SCIENCE PUBLISHERS B.V, GB, PAGE(S) 4523-4530 , XP004189973<br/>ISSN: 0032-3861<br/>Table 1, Code ZH924<br/>-----</p>   | 10,17                |
| T  | <p>BRUASETH I ET AL: "Crystallization analysis fractionation of ethene/1-hexene copolymers made with the MAO-activated dual-site (1,2,4-Me3Cp)2ZrCl2 and (Me5Cp)2ZrCl2 system"<br/>October 2004 (2004-10), POLYMER, ELSEVIER SCIENCE PUBLISHERS B.V, GB, PAGE(S) 7853-7861 , XP004606832<br/>ISSN: 0032-3861<br/>-----</p>                       | 11                   |
| X  | <p>✓ US 6 323 284 B1 (PEACOCK ANDREW J)<br/>27 November 2001 (2001-11-27)<br/>table 3<br/>-----</p>  | 11                   |
| A  | <p>✓ US 2003/088037 A1 (STEVENS JAMES C ET AL)<br/>8 May 2003 (2003-05-08)<br/>Table 3, example 10-13; LLDPE 682I; LLDPE 170;<br/>-----</p>  | 11,13                |

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## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

| Category | Citation of document with indication, where appropriate, of the relevant passages  | Relevant to claim No |
|----------|--|----------------------|
| P,X ✓    | WO 2004/046214 A (EXXONMOBIL CHEMICAL PATENTS INC; JIANG, PEIJUN; DEKMEZIAN, ARMENAG; CA) 3 June 2004 (2004-06-03)<br>paragraph '0294!<br>paragraph '0335!<br>-----  | 11                   |
| X ✓      | US 2003/195308 A1 (WAYMOUTH ROBERT M ET AL) 16 October 2003 (2003-10-16)<br>Table 10; Catalyst S 85<br>-----   | 12                   |
| X ✓      | US 6 380 341 B1 (WAYMOUTH ROBERT M ET AL) 30 April 2002 (2002-04-30)<br>Table 3 engage 8200<br>-----   | 12                   |
| P,A      | SARZOTTI D M ET AL: "Analysis of the chemical composition distribution of ethylene/alpha-olefin copolymers by solution differential scanning calorimetry: an alternative technique to Crystaf"<br>June 2004 (2004-06), POLYMER, ELSEVIER SCIENCE PUBLISHERS B.V, GB, PAGE(S) 4787-4799 , XP004515407<br>ISSN: 0032-3861<br>the whole document<br>-----   | 13                   |
| A        | GRAEF S M ET AL: "Copolymerization of propylene with higher alpha -olefins in the presence of the syndiospecific catalyst i-Pr(Cp) (9-Flu)ZrCl2/MAO"<br>1 January 2002 (2002-01-01), J POLYM SCI PART A; JOURNAL OF POLYMER SCIENCE, PART A: POLYMER CHEMISTRY JAN 1 2002, VOL. 40, NR. 1, PAGE(S) 128 - 140 , XP002355391<br>-----  | 13                   |
| X        | page 138; table III<br>-----   | 11                   |
| X        | ROSTHAUSER J W ET AL: "MECHANICAL AND DYNAMIC MECHANICAL PROPERTIES OF POLYURETHANE AND POLYURETHANE/POLYUREA ELASTOMERS BASED ON 4,4 - DIISOCYANATODICYCLOHEXYL METHANE"<br>2 May 1997 (1997-05-02), JOURNAL OF APPLIED POLYMER SCIENCE, JOHN WILEY AND SONS INC. NEW YORK, US, PAGE(S) 957-970 , XP000802668<br>ISSN: 0021-8995<br>page 958; Experimental<br>page 960; Analysis<br>page 961; Table 3, last entry<br>page 966; Figure 6;<br>----- | 14                   |
| X        | BUSAK SHAM: "Zurcon Z20 /Z22"<br>10 August 2002 (2002-08-10), BUSAK SHAMM BAN , CRISSIER , XP002355392<br>the whole document<br>-----  | 14                   |

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| C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT |  |                      |
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| Category *   | Citation of document, with indication, where appropriate, of the relevant passages   | Relevant to claim No |
| X  | <p>WO 98/49211 A (THE DOW CHEMICAL COMPANY;<br/>KALE, LAWRENCE, T; VANDERLENDE, DANIEL, D;<br/>N) 5 November 1998 (1998-11-05)<br/>figure 14; example 2a<br/>-----</p> | 16                   |



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Information on patent family members

International Application No

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| Patent document<br>cited in search report | Publication<br>date | Patent family<br>member(s)  | Publication<br>date  |
|---|---------------------|---|--|
| ✓ WO 03022890 A                           | 20-03-2003          | BR 0212437 A<br>CA 2460316 A1<br>CN 1564830 A<br>EP 1444272 A1<br>JP 2005502741 T<br>TW 588062 B  | 17-08-2004<br>20-03-2003<br>12-01-2005<br>11-08-2004<br>27-01-2005<br>21-05-2004   |
| ✓ EP 1197500 A                            | 17-04-2002          | CN 1362972 A<br>CN 1613881 A<br>WO 0155231 A1<br>US 2003114623 A1   | 07-08-2002<br>11-05-2005<br>02-08-2001<br>19-06-2003   |
| ✓ US 2002107341 A1                        | 08-08-2002          | AU 775512 B2<br>AU 7749900 A<br>BR 0016197 A<br>CA 2393446 A1<br>EP 1252199 A1<br>JP 2003515628 T<br>WO 0140325 A1<br>US 6340730 B1   | 05-08-2004<br>12-06-2001<br>13-08-2002<br>07-06-2001<br>30-10-2002<br>07-05-2003<br>07-06-2001<br>22-01-2002   |
| ✓ US 2002161141 A1                        | 31-10-2002          | AU 1790702 A<br>BR 0116461 A<br>CA 2430197 A1<br>CN 1484655 A<br>CZ 20031553 A3<br>EG 22949 A<br>EP 1349881 A2<br>JP 3678726 B2<br>JP 2004521158 T<br>MX PA03004961 A<br>NO 20032512 A<br>PL 363217 A1<br>SK 6682003 A3<br>TW 538052 B<br>WO 0246246 A2 | 18-06-2002<br>23-09-2003<br>13-06-2002<br>24-03-2004<br>12-11-2003<br>13-01-2002<br>08-10-2003<br>03-08-2005<br>15-07-2004<br>02-04-2004<br>29-07-2003<br>15-11-2004<br>03-02-2004<br>21-06-2003<br>13-06-2002 |
| ✓ US 2004044154 A1                        | 04-03-2004          | AU 2003259802 A1<br>BR 0314339 A<br>CA 2497676 A1<br>CN 1678640 A<br>EP 1546212 A1<br>WO 2004022607 A1<br>US 2005038210 A1<br>US 2005054799 A1  | 29-03-2004<br>05-07-2005<br>18-03-2004<br>05-10-2005<br>29-06-2005<br>18-03-2004<br>17-02-2005<br>10-03-2005   |
| ✓ US 2003153689 A1                        | 14-08-2003          | US 2001044506 A1<br>US 2001039314 A1  | 22-11-2001<br>08-11-2001   |
| ✓ US 6323284 B1                           | 27-11-2001          | AT 271099 T<br>BR 0016272 A<br>CA 2393698 A1<br>CN 1408011 A<br>DE 60012232 D1<br>DE 60012232 T2<br>EP 1268657 A1<br>ES 2220584 T3<br>JP 2003516452 T   | 15-07-2004<br>22-10-2002<br>14-06-2001<br>02-04-2003<br>19-08-2004<br>28-07-2005<br>02-01-2003<br>16-12-2004<br>13-05-2003   |

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Information on patent family members

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| Patent document<br>cited in search report |    | Publication<br>date |      | Patent family<br>member(s) | Publication<br>date |
|---|----|---------------------|------|----------------------------|---------------------|
| ✓ US 6323284                              | B1 |                     | MX   | PA02005714 A               | 18-09-2002          |
|   |    |                     | WO   | 0142351 A1                 | 14-06-2001          |
| ✓ US 2003088037                           | A1 | 08-05-2003          | US   | 2005187350 A1              | 25-08-2005          |
|   |    |                     | US   | 2005187351 A1              | 25-08-2005          |
| ✓ WO 2004046214                           | A  | 03-06-2004          | AU   | 2003302033 A1              | 15-06-2004          |
|   |    |                     | CA   | 2499951 A1                 | 03-06-2004          |
|   |    |                     | EP   | 1558655 A2                 | 03-08-2005          |
|   |    |                     | WO   | 2005108442 A1              | 17-11-2005          |
| ✓ US 2003195308                           | A1 | 16-10-2003          | NONE |                            |                     |
| ✓ US 6380341                              | B1 | 30-04-2002          | NONE |                            |                     |
| ✓ WO 9849211                              | A  | 05-11-1998          | AU   | 742617 B2                  | 10-01-2002          |
|   |    |                     | AU   | 7173998 A                  | 24-11-1998          |
|   |    |                     | BR   | 9808704 A                  | 11-07-2000          |
|   |    |                     | CA   | 2288893 A1                 | 05-11-1998          |
|   |    |                     | CN   | 1112383 C                  | 25-06-2003          |
|   |    |                     | EP   | 0977787 A1                 | 09-02-2000          |
|   |    |                     | JP   | 2001522399 T               | 13-11-2001          |
|   |    |                     | NO   | 995294 A                   | 29-12-1999          |
|   |    |                     | PL   | 336594 A1                  | 03-07-2000          |
|   |    |                     | RU   | 2200169 C2                 | 10-03-2003          |
|   |    |                     | TR   | 9902884 T2                 | 21-09-2000          |